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REPORT OF THE WORK CONDUCTED UNDER THE

PRAIRIE FARM REHABILITATION ACT

FOR THE FISCAL YEAR 1935-36

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Report of the Work Conducted under the Prairie Farm
Rehabilitation Act for the Fiscal Year 1935-36

The Prairie Farm Rehabilitation Act was passed by the Parliament of Canada in April, 1935, "to provide for the rehabilitation of drought and soil drifting areas in the provinces of Manitoba, Saskatchewan, and Alberta". For this work the Act provides for an appropriation of \$750,000 for the fiscal year 1935-36, and an amount not to exceed \$1,000,000 for each of the four succeeding fiscal years.

Administration of this Act is vested in the Federal Minister of Agriculture, who is assisted by an Advisory Committee appointed by Order-in-Council. The Advisory Committee comprises representatives of farming, ranching, financial, and railway interests in the affected areas, as well as officials of Governments of the Dominion and of the Provinces concerned. The function of the Advisory Committee is to suggest measures to the Minister for the Rehabilitation of drought and soil drifting areas. Detailed organization and supervision of work under the Act is largely performed by the Dominion Experimental Farms.

Unprecedented conditions of extreme drought, accompanied by widespread soil drifting, have been experienced during recent years throughout extensive areas in southwestern Manitoba, southern Saskatchewan, and southern Alberta. These conditions have resulted in very serious losses to farmers due to yield reduction and crop failures, and to ranchers through shortage of grass, feed, and water. The economic loss caused by drought has been further increased by low prices which have been paid for agricultural produce during the drought years. As a result of these conditions severe hardship has been experienced throughout the affected areas, destitution has been widespread, and very large expenditures on relief have been necessary. It is the object of the Prairie Farm Rehabilitation Act to enable farmers to remedy the destructive effects of drought and soil

2.

drifting and to take all possible steps to avoid their recurrence.

Under the rehabilitation programme which has been inaugurated in accordance with the terms of this Act, efforts are being made to effect improvements in farming practices and land utilization. An essential feature of this work is the encouragement given to farmers to solve their own drought and soil drifting problems by community cooperative action, with a minimum of material and financial assistance from governmental sources. For this reason the rehabilitation programme is largely demonstrational and fact finding, with the object of supplying leadership and guidance for permanent readjustment of agriculture in the affected area rather than to provide temporary assistance during the continuance of the existing conditions.

With the foregoing general aims in view, measures are being introduced throughout the drought and soil drifting areas to secure the most economical utilization of soil moisture for crops, to prevent soil drifting, and to reclaim abandoned farm land for its most suitable use in either crop production or grazing. Drought resistant grasses, with soil binding properties are being used for the production of hay or pasture on areas of land which are unsuitable for grain production. Regrassing work of this nature is especially timely in the semi-arid areas of Saskatchewan and Alberta in view of the present trend towards grazing on these areas. Tree planting as a measure of soil drifting control is being conducted on a large scale, both for demonstrational and experimental purposes. Throughout this work considerable attention is being given to the economic aspects.

An important part of the rehabilitation programme is the development of surface water resources for stockwatering purposes, and for the production of reserve supplies of feed under irrigation.

In connection with all phases of this programme a considerable amount of investigational work is in progress, while the demonstrational projects have valuable fact-finding qualities.

The various rehabilitation measures in use, and the agencies through which they are being introduced, are described below, together with some reference to the progress made during the fiscal year 1935-36.

District Experiment Sub-Stations

The District Experiment Sub-Stations are essentially outposts of the Dominion Experimental Farms, devoted to demonstrational and experimental work on the production of crops in areas affected by drought and soil drifting. These stations, consisting usually of one section of land, are private grain-growing farms operated by the owners under the direction and supervision of officials of the Dominion Experimental Farms.

During 1935 thirty-nine District Experiment Sub-Stations were established at strategic points in the affected area of the Prairie Provinces. The location by general districts of the various Sub-Stations is shown in the following list.

Location of District Experiment Sub-Stations Operated under the Prairie Farm Rehabilitation Act in the Prairie Provinces

Southwestern Manitoba

Goodlands	Lyleton	Pipestone
-----------	---------	-----------

Southeastern Saskatchewan

Alameda	Radville	Weyburn
Avonlea	Strasbourg	

Southwestern Saskatchewan

Canuck	Limerick	Tompkins
Carmichael	Lisieux	Tugaske
Fox Valley	Parkbeg	Valjean

Southwestern Saskatchewan

Gravelbourg	Piapot	Willow Bunch
Herbert	Riverhurst	
Kincaid	Shaunavon	

Central Saskatchewan

Dunblane	Juniata	Loverna
Guernsey	Kindersley	Rosetown

Southern Alberta

Bindloss	Consort	Whitla
Castor	Foremost	Youngstown
Cessford	Lomond	Pincher Creek

Inasmuch as the District Experiment Sub-Stations serve as the principal means of introducing the best measures of drought and soil drifting control, and of determining the relative value of different measures in various districts, the work of these stations is described below in some detail.

Rotations - Rotation practices on the Sub-Stations are designed to effect the most economical utilization of limited supplies of soil moisture for growing crops. On all Sub-Stations a two-year rotation of summerfallow and grain is followed, in comparison generally with a three-year rotation of summerfallow and two years of grain. The object of the frequent summerfallows is partly to destroy drought-resistant weeds which compete at an advantage with the grain crops, but principally to ensure maximum yields by conserving moisture received during the summerfallow year for the benefit of crops in the succeeding year. In districts where livestock production is feasible, longer rotations, including soil binding hay or pasture crops, are also being followed.

Strip Farming - Frequent summerfallows, while valuable for soil moisture conservation, have the disadvantage of increasing the liability of soil to drifting. To offset this disadvantage

the practice of "strip-farming" has been devised, whereby crops are sown in long narrow strips of from 4 to 16 rods in width, in alternation with similar strips of fallow. These strips, which are run at right angles to the prevailing wind, reduce the distance over the summerfallow land on which the wind exercises its erosive effect.

Strip farming has proved very effective in checking soil drifting in some localities, particularly in southern Alberta. For this reason part of the grain produced on each Sub-Station is grown in strips, with the object of introducing this practice in districts where it has not been previously tried.

Cover Crops - Cover crops of fall sown spring grain are being used on part of the summerfallow land on all Sub-Stations to prevent fall and spring drifting. This practice may be followed in conjunction with strip farming or independently. As cover crops are usually sown about the first of August they do not make sufficient growth before freeze-up to greatly reduce the moisture conserved during the previous period of bare fallow. Where cover crops make fair growth they prevent drifting.

Cultural Practices - The method employed in cultivating the soil, especially on summerfallow land, has considerable influence on the readiness with which soil drifts. Experience has shown that drifting is less likely to occur on cultivated land which is left in a rough cloddy condition than where the soil is finely pulverized. Furthermore, any method of cultivation which leaves a large percentage of stubble or other trash on the surface is more effective in checking soil drifting than where such material is completely buried. For instance it has been frequently found that the "ploughless" fallow in which the summerfallow land is cultivated without ploughing, with a resultant incomplete coverage of trash, has proved more satisfactory under soil drifting conditions than the standard ploughed fallow. With a

view to determining the best methods of cultivation for different types of soil where drifting is prevalent, cultural experiments are being conducted in conjunction with the various cropping methods, on all District Experiment Sub-Stations.

In view of the fact that work on the District Experiment Sub-Stations was not completely organized during 1935, the full value of the control measures described above was not determinable. Some success, however, in controlling soil drifting was experienced in districts where drifting was general. During the growing season of 1936 when the prescribed programme of work will be in full operation on each Sub-Station established in 1935, the relative value of different drought and soil drifting control measures should become more clearly apparent.

Reclamation Projects

Very considerable acreages of farm land in various parts of the Prairie Provinces have been seriously injured by soil drifting or abandoned to weed growth because of inadequate precipitation. These areas not only represent an appreciable reduction in the agricultural resources of the country but constitute undesirable centres from which drifting of weed infestation may spread to adjacent territory. For this reason the reclamation of these areas is both desirable and necessary. The reclamation of this land, either for grain production or for grazing purposes presents many problems in agricultural practice. For the solution of these problems various reclamation projects have been established under the rehabilitation programme. This phase of the work is essentially investigational, but will eventually possess considerable demonstrational value. Investigations on the reclamation of land for farming purposes were started during 1935 at Melita,

Manitoba, and Mortlach, Saskatchewan. Regrassing reclamation, with the object of restoring abandoned farm land for hay production at Kerrobert, Saskatchewan.

Reclamation Station, Melita, Man. - The reclamation project at Melita consists of an extensive series of experiments conducted on two sections of abandoned drifted land. These deal with various aspects of crop production on marginal land, such as rotations under both strip farming and large field conditions, the growing of cover crops, and the cultural management of light drifting soil. The value of tractor powered equipment for this work is being determined. Experiments are also being planned on the use of fertilizers on drifted soil, on methods of establishing grasses and clovers for soil binding purposes, and for the production of hay and pasturage. Plans are being formulated to determine the influence of field crop shelterbelts of trees on the yield of farm crops.

During 1935 the work of Melita was in the preparatory stage only, the full programme of reclamation to be in force in 1936.

Mortlach Reclamation Station, Mortlach, Sask.

Reclamation work at Mortlach, conducted on two sections of light, drifting land, is similar to the work at Melita, but with more attention being paid to regressing problems.

Regrassing Reclamation - With the object of re-establishing grass cover on large tracts of abandoned farm land, regressing experiments have been started in southeastern Alberta. The area in which this work is being done lies between Ranges 1 to 14 west of the Fourth Meridian, and extends north from Medicine Hat to Sullivan Lake and Sounding Lake. Within this area much of the land which was formerly used for grazing purposes was brought under grain production,

and subsequently abandoned by reason of inadequate precipitation. This land now supports a weed coverage of Russian thistle, sage and poverty weed, and is subject to widespread soil drifting. The object of the regrassing experiments is to determine the best methods of establishing a grass cover which shall displace weeds, hold soil against drifting, and furnish grazing for livestock.

During the fall of 1935 regrassing work was started at the following points in southeastern Alberta: Naco, Sounding Creek area; Stanmore, North Berry Creek area; Cessford, South Berry Creek area; Hutton; and Bowell, Tilley East area. At each of these points some seeding of crested wheat grass was done in the fall of 1935, and plans made for more extensive seedings, in the future. Several methods of seeding down are being tried, including broadcasting and drilling on uncultivated weedy land, and similar seedings on land which had received some preparatory seed bed cultivation. On bare drifted areas suitable fall sown cover crops are being used to hold the soil until the growth of grass is well started. The results of these experiments will afford guidance for more extensive work throughout this area.

Kerrobert Reclamation Area, Kerrobert, Sask.

Regrassing experiments, similar to those in Alberta, were started during 1935, on sandy land in the vicinity of Kerrobert, Sask. The principal object of this work is to check soil drifting by growing forage crops of hay. Small acreages of crested wheat grass have been sown on eleven farms in this district in order to provide supplies of seed for more extensive seeding in the future.

Agricultural Improvement Associations

For the purpose of informing farmers of the aims and objects of the rehabilitation programme, and of encouraging

cooperative community action on drought and soil drifting problems Agricultural Improvement Associations have been organized among farmers at a number of points throughout the drought area. The essential characteristic of these Associations is that the members agree to adopt as uniformly as is practicable such measures for drought and soil drifting control as seem suitable under local conditions. In this manner the effectiveness of these control measures is greatly increased as compared with the uncoordinated efforts of individual farmers. For this reason special assistance is offered members of Associations to enable them to introduce certain rehabilitation measures on their farms.

Assistance given to Agricultural Improvement Associations under the Rehabilitation Act includes the services of officials of the Dominion Experimental Farms in organization work, and in personal advice to members regarding practical farming problems. Financial assistance is given to defray the administrative expenses of the Associations. Members of these Associations may receive limited quantities of free grass or other forage crop seed for propagation purposes. In addition, trees for home shelter belts are supplied free, together with some financial assistance for planting. The actual amount of assistance given for the foregoing purposes is governed to some extent by the activity of individual associations.

Twenty-seven Agricultural Improvement Associations were organized during the fiscal year 1935-36. In addition four Strip Farming Associations, which were organized to combat soil drifting prior to the inauguration of the rehabilitation programme, were brought under the provisions of the Act, making a total on March 31, 1936 of 31 Associations with well over 2600 members. The names of these Associations with the location of their headquarters are shown in the following statement.

Agricultural Improvement Associationunder thePrairie Farm Rehabilitation Actas of March 31, 1936.Name of AssociationHeadquartersManitoba

Goodlands and District Agricultural Improvement Association	Goodlands, Man.
Lyleton Agricultural Improvement Association	Lyleton, Man.
North Brenda Agricultural Improvement Association	Medora
Pierson and District Agricultural Improvement Association	Pierson
Sifton-Pipestone-Albert Agricultural Improvement Association	Reston

Saskatchewan

Aneroid Strip Farming Association	Aneroid
Beechy Agricultural Improvement Association	Beechy
Ceylon Agricultural Improvement Association	Ceylon
Chaplin Agricultural Improvement Association	Chaplin
Estevan Agricultural Improvement Association	Estevan
Gull Lake Strip Farming Association	Gull Lake
Hazenmore Agricultural Improvement Association	Hazenmore
Herbert Agricultural Improvement Association	Herbert
Kincaid Agricultural Improvement Association	Kincaid
Lafleche Agricultural Improvement Association	Lafleche
Limerick Strip Farm Association	Limerick
Lucky Lake Agricultural Improvement Association	Lucky Lake
Macrorie Agricultural Improvement Association	Macrorie
Maple Creek Agricultural Improvement Association	Maple Creek

Meyronne Agricultural Improvement Association	Meyronne
Minton Agricultural Improvement Association	Minton
Moose Jaw Agricultural Improvement Association	Moose Jaw
Mortlach Agricultural Improvement Association	Mortlach
Orkney Agricultural Improvement Association	Orkney
Shamrock Agricultural Improvement Association	Shamrock
Shaunavon Strip Farming Association	Shaunavon
Sidewood Agricultural Improvement Association	Sidewood
Tugaske Agricultural Improvement Association	Tugaske
Valor Agricultural Improvement Association	Valor
Weyburn Agricultural Improvement Association	Weyburn

Alberta

Argyle-Clear Lake Agricultural Improvement Association	Claresholm
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Grass Seed Production

In connection with the work on the District Experiment Sub-Station Reclamation projects and Agricultural Improvement Associations a quite extensive acreage of land is being seeded down with hay or pasture crops. Supplies of seed for these projects are being secured from various sources, but principally through the Dominion Forage Crop Laboratory at Saskatoon, and the Dominion Seed Branch. During the fiscal year the following quantities of seed were supplied for various rehabilitation projects:

Crested wheat grass	86,384	pounds
Brome grass	25,760	"
Western rye grass	8,190	"
Sweet clover	35,000	"
Alfalfa	7,230	"
Alsike clover	500	"
Timothy	1,000	"
Reed canary grass	500	"
Cereal grains	386,260	"
Total	550,824	"

While seed of such commonly sown hay crops as sweet clover, western rye grass, and brome grass are usually available in sufficient quantities, it has been found desirable to augment seed supplies of crested wheat grass and alfalfa. To increase the supply of crested wheat grass seed 1478 pounds of seed of the Fairway strain of this grass were distributed for propagation purposes to forty selected growers on condition that the resultant crops of seed should be sold to the Dominion Department of Agriculture if required. Grimm alfalfa seed was distributed under similar conditions to a number of growers in Northern and Eastern Saskatchewan. Satisfactory results have been secured in a large percentage of these seeding projects.

In order to determine the best methods of seeding perennial grasses and legumes seeding experiments are being conducted by the Dominion Forage Crops Laboratory at Saskatoon, in cooperation with a number of farmers in that district. In these experiments grasses and legumes were seeded at different dates on light soils both broadcast and drilled, with and without cultural treatments. While the results secured during 1935 were not sufficiently conclusive to enable recommendations to be made, they provide some valuable guidance for future investigations.

The need for improved varieties of drought resistant forage crops is being dealt with in the plant breeding activities of the Dominion Forage Crops Laboratory at Saskatoon. In this connection some promising work is being done with non-creeping brome grass, which will be easier to eradicate when desired than ordinary creeping brome grass, and creeping rooted yellow blossom alfalfa, which would be useful in checking soil drifting. Work of this nature, of course, requires a fairly long period of years for successful consummation.

Tree Planting

Tree planting as a measure of soil drifting control is being undertaken in the drought area as part of the rehabilitation programme. The principle involved in this work is that field shelter belts of trees and hedges, if successfully established, will check the velocity and reduce the erosive effects of high winds near the soil surface. The reduction in wind velocity, moreover, may tend to check evaporation from the soil and transpiration from growing crop plants, and thereby create a more favorable environment for plant growth than exists on the open prairie. Trees around farm homes provide some welcome shelter for buildings and gardens, in addition to possessing considerable aesthetic value. It is the object of the tree-planting phase of the rehabilitation programme to ascertain the feasibility of tree-planting in different districts on the prairies and to measure accurately its effect on adjacent soils and crops.

Afforestation on the prairies which are largely treeless by nature is beset with many difficulties arising from unfavorable climatic conditions. Many failures to establish and maintain plantations have been experienced but success has been achieved in a sufficient number of cases to demonstrate that trees can be grown at many points on the prairies, providing suitable species are used, and proper methods of planting and maintenance are followed. The Tree-Planting Division of the Dominion Experimental Farms is in a position to supply both trees and expert supervision for this work.

For a number of years there has been a free distribution of tree seedlings to farmers throughout the Prairie Provinces from the Forest Nursery Stations at Indian Head, Sask. and Sutherland, Sask. In addition to continuing this service, the

rehabilitation programme provides trees, together with supervisory and financial assistance in tree-planting to District Experiment Sub-Stations, Agricultural Improvement Associations and Field Crop Shelter Belt Associations. During the fiscal year 1935-36 the number of trees supplied for the above purposes was 6,440,195.

Field Crop Shelter Belt Associations

These Associations have been formed by farmers in selected districts where it is desired to establish demonstration field shelters in order to determine their effect in checking soil drifting and conserving soil moisture. Each member of an Association undertakes to plant field shelter belts on his farm with the assistance and under the supervision of the Tree Planting Division. As the farms in districts where this work is being done are located in compact groups, this arrangement provides an excellent opportunity to determine what beneficial effect may be expected from large scale plantations. During the fiscal year 1935-36, Field Crop Shelter Belt Associations were organized at Conquest, Ribstone, and Aneroid in Saskatchewan, and at Lyleton, Manitoba. A similar project is being conducted under municipal auspices at Kindersley, Sask.

The Conquest Field Crop Shelter Belt Association was organized in January, 1935, and subsequently brought under the operation of the Rehabilitation Act. By March 31, 1936, this Association comprised 27 members representing a farming area of 51,840 acres. During 1935 over 80,000 trees were planted in shelter belts in this area, and preparations were made to plant 372,200 trees in the spring of 1936. This project has met with very encouraging success in its initial stages.

The Associations at Ribstone, Aneroid, and Lyleton were organized in the latter part of the fiscal year 1935-36, with a view to commencing tree planting operations in 1936.

In the Kindersley project assistance is being given to the municipality in planting shelter belts for reclamation purposes on an area of sandy soil about 10 miles northwest of the town of Kindersley. During 1935 some 27,500 seedlings were planted in this area, and preparation has been made to plant about 150,000 seedlings during 1936. Seedlings planted in this project have survived subsequent drought conditions remarkably well.

To cope with the increased demand for trees arising from the rehabilitation programme, it has been necessary to enlarge considerably the planting facilities of the Forest Nursery Stations at Indian Head and Sutherland, and to establish subsidiary nurseries at the various Dominion Experimental Farms in the Prairie Provinces. During 1935 preparations were made to supply over nine million seedlings for rehabilitation purposes.

Soil Research

In connection with the investigational and demonstrational work on problems arising from drought and soil drifting which are in progress on the Dominion Experimental Farms and on the various rehabilitation projects described above, a considerable amount of fundamental research on soil problems is being conducted. The object of this work is to determine the scientific principles underlying moisture conservation, soil drifting control, and related problems. The practical application of these principles may modify and improve existing agricultural conditions.

For the furtherance of this work a Soil Research Laboratory has been erected on the Dominion Experimental Station at Swift Current, Sask. This laboratory will serve as a centre for research work on drought and soil drifting, and will provide analytical services for various rehabilitation projects. An important phase of the work at this laboratory will be the continuance and expansion of the soil moisture investigations which

have been in progress at Swift Current since 1922. These investigations have been productive of much useful information regarding summerfallow practices, and their extension under the rehabilitation programme is very desirable. Accurate determinations of the effect of various cultural and cropping practices on the susceptibility of different types of soil to drifting will form an important line of work at the Soil Research Laboratory. Similar work is in progress in connection with tree shelter belts and hedges.

In addition to the work at Swift Current, soil research investigations relative to drought and soil drifting are being conducted cooperatively by the Dominion Experimental Farms and the Provincial Universities in each of the Prairie Provinces.

Soil Survey

The object of soil survey work is to determine the nature, extent, and location of various types of soil, with special reference to their crop producing capacities. This work, in addition to being of fundamental value in soil research work, is particularly useful in the formulation of land utilization policies and for the guidance of farmers and prospective settlers.

For a number of years soil surveys have been conducted in each of the Prairie Provinces under the direction of the Provincial Universities. Under the rehabilitation programme soil survey work throughout the drought area is being accelerated by the Provincial Universities and the Dominion Experimental Farms.

During 1935 the Department of Soils of the University of Manitoba conducted a soil survey of 1,774,080 acres of land in the southwestern part of the province. The area surveyed

consisted of Townships 1 to 7 inclusive in Ranges 19 to 29 west of the Prime Meridian. This survey covers the principal drought and soil drifting area in Manitoba. As part of this work investigations are being made into the relation between the textural composition of soils and their susceptibility to drifting. The effect of drifting on soil fertility is also being investigated with a view to determining remedial measures. Previous surveys in Manitoba had covered the Red River soils south of Winnipeg, and several other areas in the southern part of the province.

A reconnaissance soil map of the southern part of Saskatchewan, with a descriptive report, was prepared during 1935 for publication by the Soils Department of the University of Saskatchewan. This map is the result of work done during several years prior to and including 1935. The area covered by this survey, consisting of more than 60 million acres of land or about two-fifths of the total land area of the province, extends from the International Boundary to Township 48, and includes practically all of the settled agricultural land in the province. Further soil survey work in Saskatchewan will consist of reconnaissance surveys in the northern part of the province, and detailed surveys of problem areas in the South.

Soil survey work has been in progress in Alberta for a number of years, and several large areas, both in the southern and northern parts of the province have been covered. During 1935 the soil survey party of the University of Alberta covered an area of approximately 921,600 acres, located in Townships 1 to 8 inclusive, Ranges 1 to 5 west of the Fourth Meridian. In this work special attention is being given to "blow-out" and drifting areas.

Economic Survey

A comprehensive study of land utilization in Saskatchewan and Alberta is being conducted as a part of the Prairie Farm Rehabilitation programme by the Economics Branch of the Department of Agriculture with the cooperation of the Department of Farm Management of the University of Saskatchewan and the Provincial Department of Agriculture in Alberta.

During 1935 detailed information was secured from 850 farmers in seven municipalities in southwestern Saskatchewan including such points as Chaplin, Coderre, Shamrock, Gravelbourg, Lafleche, Wood Mountain and Glenworth. In Alberta, with the cooperation of five hundred and thirty-four farmers, the area surveyed is in the south central part of the Province surrounding Vulcan, Lomond, Wheat Centre, Retlaw, Barrons, Carmangay and Champion. In addition to data obtained from farms still in operation, considerable information was secured regarding abandoned farms and municipal records are being used to provide data on municipal receipts, expenditure, tax arrears and assessment of farm properties.

In carrying on this project, economic analysis is being related to the soil survey which has been carried on in these provinces in previous years. Information regarding the economic returns on farms located on different soil types is essential to an appraisal of the efficiency of methods and practices adopted and the possibility of obtaining a satisfactory living from farms located in such areas. Data are being secured on size of holdings, land tenure, crop yields and livestock production, farm receipts and expenses, cropping practices, livestock carrying capacity, indebtedness, operator's history, settlement of the area and

farm abandonment. When these data have been analyzed the information obtained should be a guide to the future policy of land utilization in these areas. This study is the first of its kind to be carried on in Canada.

Water Development

Under the terms of the Prairie Farm Rehabilitation Act engineering and financial assistance is provided for farmers and ranchers in the construction of dugouts, stock-watering dams, and small irrigation schemes. The object of this phase of the rehabilitation programme is to effect the stabilization of livestock production by impounding spring run-off to supplement inadequate or unreliable stockwatering supplies, and in some cases to enable reserve supplies of forage to be grown under irrigation. Inasmuch as the various provincial governments require that the majority of water development projects be supervised by qualified engineers, many farmers and ranchers are unable to store run-off water because of the expense involved. The provision of engineering assistance enables such farmers to improve their water facilities, while the financial assistance accorded helps to meet the cost of materials and hired help. An important condition attaching to this form of assistance is that such water development projects shall be of some benefit to the community where they are located, rather than to private individuals alone.

Water development under the Prairie Farm Rehabilitation Act is supervised by a Water Development Committee comprising representatives of the Dominion and Provincial Governments.

Applications received by the Water Development Committee for assistance are examined by the agricultural and engineering

staffs to determine the feasibility of the proposed projects. Construction of approved projects is done by the applicant under the supervision of the engineering staff.

During the fiscal year 1935-36 77 small projects, including 49 dugouts, 20 stockwatering dams, and 8 small irrigation projects were constructed under the Prairie Farm Rehabilitation Act in the Prairie Provinces.

Hydrometric Survey

Hydrometric records provide information as to the quantity of "run-off" water available for storage and irrigation in streams and rivers. Records of this type are essential for the correct design of works in the construction of storage reservoirs and irrigation projects.

The Dominion Water Power and Hydrometric Bureau of the Department of the Interior has conducted a hydrometric survey throughout Canada for a number of years. Records secured in this survey have been published for a number of years up to and including the year 1928-1929, after which year publication was temporarily suspended. Inasmuch as the hydrometric records in the Prairie Provinces for the years 1929-30 to 1934-35 inclusive, during which period severe droughts have been experienced, would be very useful in connection with water development work, arrangements have been made, under the Prairie Farm Rehabilitation Act to have these records printed for public use. Arrangements have also been made for the extension of hydrometric work in the drought areas. This phase of the work includes the establishment of a number of new "gauging" stations.

Expenditures under the
Prairie Farm Rehabilitation Act.

For the Fiscal Year 1935 - 1936.

District Experiment Sub-Stations	\$70,524.51
Reclamation Projects	14,719.55
Agricultural Improvement Associations	1,156.43
Grass Seed Production	48,066.34
Tree Planting	18,602.79
Soil Research	7,632.62
Soil Survey	12,842.69
Economic Survey	5,832.40
Water Development	123,881.87
Hydrometric Survey	7,483.31
Administration, office furniture and equipment	31,681.50
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	\$342,424.01
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APPENDIX

Progress Report on Water Development

Under the

Supplementary Public Works Construction Act, 1935

For the Fiscal Year Ending March 31, 1936

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Progress Report on Water Development Under the
Supplementary Public Works Construction Act, 1935
for the Fiscal Year Ending March 31, 1936.

Under the terms of the Supplementary Public Works Construction Act, 1935 (Item 6, Western Conservation Works) the sum of \$500,000 was made available for the construction of water development projects in the Prairie Provinces. This sum is being used in the construction of large agricultural water development projects in the drought areas as part of the rehabilitation programme while small water development projects are cared for under the Prairie Farm Rehabilitation Act. Engineering services for both large and small projects are provided for under the latter Act. Administration of this fund is through the Water Development Committee under the Dominion Experimental Farms of the Department of Agriculture.

The object of the water development work under the Supplementary Public Works Construction Act is to provide community water storage facilities for domestic, stock-watering, and small irrigation projects in areas where a dependable supply is not normally available. It is planned to effect some degree of stabilization in livestock production by ensuring water supplies and reserves of feed during periods of partial or complete crop failure.

Under the foregoing programme of water development a number of storage dams and irrigation projects are being constructed, while some existing works are being repaired or improved.

The guiding principle in the selection of projects is that of minimum cost per water user or per acre irrigated combined with maximum benefit in terms of livestock production. Where existing projects are repaired or improved the object is

to enable settlers on the projects to continue their agricultural operations. An essential condition in all projects is that a legally incorporated body such as a municipality or irrigation district be prepared to assume all responsibility for the maintenance, operation and control of works when constructed. As surface water resources in the Prairie Provinces are under provincial jurisdiction, all projects must conform to the water rights legislation in each province. For this reason, provincial cooperation is an integral feature of the water development programme.

Progress of Water Development Work in 1935

During 1935 work was started on a number of community water development projects in the drought areas of the Prairie Provinces. Inasmuch as actual construction on these projects was not undertaken until late in the summer, owing to the necessity of a large amount of preliminary organization and survey work, the amount of construction accomplished before winter was small compared with the amount projected. Nevertheless, some of the projects on which construction was started in 1935 were completed during the same year, and others were sufficiently advanced to enable completion during 1936. In addition, plans were completed in 1935 for certain projects on which construction work was deferred till 1936. The various projects mentioned above are enumerated and described below.

Large Water Development Projects in 1935

Community Irrigation Projects begun 1935

1. Val Marie Irrigation Project, Sask.
2. Eastend Irrigation Project, Sask.
3. Wild Horse, Alta.
4. Middle Creek Storage Reservoir, Sask.

Community Water Storage Projects begin in 1935

5. Souris Dam, Man.
6. Crystal City Dam, Man.
7. Rural Municipality of Edward Stockwatering Dams, Man.

Drainage Projects begun 1935

8. Municipality of Lajord Reclamation Project, Sask.

Rehabilitation of Existing Projects

9. Eastern Irrigation District, Brooks, Alta.
10. Canada Land and Irrigation Company, Vauxhall, Alta.

Projects Prepared for Construction in 1936

11. Adams Lake Dam, Sask.
12. Wood River Storage Dams, Sask.
13. Red Deer River Experimental Gas Well, Alta.

Community Irrigation Projects

1. Val Marie Irrigation Projects, Sask. - This project located on the Frenchman River near the village of Val Marie in southwestern Saskatchewan, is designed to provide dependable reserves of feed for livestock in the adjacent ranching district, by the irrigation of over 5000 acres of river bottom land. For this purpose a dam is being constructed across the Frenchman River about 6 miles northwest of Val Marie, to impound spring run-off water in a reservoir of some 6000 acre - feet capacity. Water for irrigation will be conveyed by canal along the left bank of the river for a distance of 6 miles to a point near Val Marie. This canal will be used for stockwatering purposes and for the irrigation of about 2000 acres of land on the left bank of the river. Near Val Marie the canal will cross the Frenchman River through an inverted siphon, from which point water will be distributed through ditches to about 3000 acres of land south of the village.

Excess irrigation water will be returned to the Frenchman River by means of drainage ditches.

When constructed this project will be owned and operated by the Val Marie Irrigation District, incorporated under Saskatchewan irrigation law. Irrigable land in this project will be divided into parcels of about 80 acres each, for the production of reserve supplies of forage by local farmers and ranchers.

Construction of the Val Marie Irrigation Project was begun in 1935, and should be completed in 1936.

2. Eastend Irrigation Project, Sask. - Located on the Frenchman River some 50 miles northwest of Val Marie this project is designed to provide for the irrigation of approximately 2214 acres of river bottom land near the village of Eastend. This land was successfully irrigated some years ago under the Enright and Strong Irrigation scheme, which was subsequently abandoned due to destruction of the intake dam by ice. The present project contemplates the reconstruction of the older scheme, with water storage facilities of adequate strength. Like the Val Marie project, described above, the Eastend project is to be used for the production of reserve supplies of forage.

In the Eastend project a dam will be constructed across the Frenchman River about two miles west of Eastend, providing storage for approximately 1653 acre feet of water. Irrigation water will be conveyed from the reservoir along the right bank of the river to a point near the village of Eastend. At this point part of the water will be diverted across the river through an inverted siphon for irrigation of land on the left bank, while the remainder will be distributed to land on the right bank.

The future operation of the Eastend Irrigation District will be under similar conditions to those in the Val Marie

project cited above. Actual construction work on this project will be started early in 1936, on the basis of plans prepared in 1935.

3. Wild Horse Storage Dam, Alberta. - The Wild Horse Storage Dam is located on a tributary to Sage Creek about five miles east of the Dominion Range Experimental Station in the southeastern corner of Alberta. The storage reservoir formed by this dam provides for the flood irrigation of hay meadows, as well as ensuring an adequate water supply for livestock in the neighbourhood. Construction on this project was well advanced by the beginning of winter in 1935, and no difficulty is anticipated in finishing the work during 1936.

A noteworthy feature of the irrigation project at Val Marie, Eastend and Wild Horse is the relatively short distance between reservoir and irrigable land. This feature has the double advantage of keeping down construction and repair costs and of minimizing wastage of water due to seepage.

4. Middle Creek Storage Reservoir, Sask.

Middle Creek rises in Alberta on the southern slope of the Cypress Hills, and flows in a southeasterly direction through the southwestern corner of Saskatchewan. Along the Saskatchewan section of the creek it is estimated that there are 3000 acres of irrigable land. To provide the necessary water storage for the irrigation of this land a dam is being constructed in Section 21 - 5 - 30 W 3 across Middle Creek. This dam which was partially constructed in 1935, will enable reserve supplies of forage to be produced under irrigation for livestock in the local ranching communities.

Community Water Storage Projects

Storage of river water for community use is being effected at a number of points by the construction of dams across water courses.

5. Souris Dam, Man. - This project consisted of making major repairs to an old municipal dam across the Souris River at the town of Souris, Man. By means of this dam spring flow water is impounded in a reservoir for use during the summer months when the normal flow of water in the Souris is low. In addition to improving water supply for the town of Souris, this project ensures water for farmers in the neighbourhood. Work on this project was completed during 1935.

6. Crystal City Dam, Man. - At the village of Crystal City in southern Manitoba a new dam has been constructed across a tributary to the Pembina River, with the object of providing dependable water supplies for both village and farming communities.

7. Rural Municipality of Edward, Man. - The Rural Municipality of Edward consists of eight townships in the southwestern corner of Manitoba. Several creeks, tributaries of the Souris River, flow through this municipality. These creeks, which provide the principal water supply for stock raisers in this municipality, normally stop running after the spring flood, leaving pools which become stagnant and unfit for use. With the object of improving this condition by providing a continuous flow of water in the dry summer months, four storage dams were constructed during 1935, one on Graham Creek, two on Gainsborough Creek, and one on Antler Creek. As there is considerable livestock production in this area, these dams should be of considerable benefit to local farmers.

Drainage Projects8. Municipality of Lajord Reclamation Project, Sask. -

With the object of reclaiming lands which are subject to periodical flooding in the spring from Wascana Creek certain sections of this creek located in the Municipality of Lajord are being straightened to effect a more rapid stream flow. Five cut-offs involving the excavation of 45,000 cubic yards of earth are being made. This project will be completed in 1936.

Rehabilitation of Existing Projects

9. Eastern Irrigation District, Alta. - This project was formerly the Eastern section of the Canadian Pacific Railway Irrigation scheme. In 1935 the C.P.R. relinquished its ownership and control of the irrigation works to the Eastern Irrigation District organized under Alberta law by farmers and ranchers located on the project. To enable improvements to be made in the irrigation works which would render the project self-supporting, financial assistance has been given under the rehabilitation programme to the new Irrigation District. This work was completed during 1935.

10. Canada Land and Irrigation Company Vauxhall, Alta. - The irrigation system of the Canada Land and Irrigation Company was constructed during the years from 1909 to 1920 at a capital cost of approximately \$15,000,000. Water for this system is diverted from the Bow River at a point near Carseland, Alta. and conveyed thence by a canal for a distance of 110 miles to the irrigation area of approximately 40,000 acres in the vicinity of Vauxhall, Alta. Some of the water carried by the Canada Land and Irrigation Company's canal is diverted under agreement to about 4500 acres of irrigable land in the New West Irrigation District, which lies to the west of the Vauxhall district.

The extremely high capital cost of the Canada Land and Irrigation project, in relation to the acreage under irrigation, has involved the Company in financial difficulties on several occasions. In recent years the very low prices received for agricultural products has reduced the revenues of the Company to such an extent that necessary repairs and current operation has become impossible. As about 250 farmers settled on the lands of the Company are entirely dependent on the continued operation of the project for water, cessation of this service would entail considerable hardship and economic ruin. To avoid this undesirable eventuality it has been decided that sufficient financial assistance should be given the project to enable the continued delivery of water for irrigation purposes. Actual work on this project will be conducted during 1936.

Water Development Projects

Prepared for Construction in 1936

The projects described below were planned in 1935 but actual construction was deferred until the following year.

11. Adams Lake Dam, Sask. - In order to provide a reserve of water for irrigation along Battle Creek in southwestern Saskatchewan it is proposed to construct a storage dam at the headquarters of this creek in Township 8-29 W 3. As there are about 8000 acres of irrigable land along Battle Creek, the storage provided by this dam should enable valuable reserves of forage to be grown for use in dry years.

12. Wood River Storage Dams, Sask. - As an initial step in establishing a number of community stockwatering dams on the Wood River and its tributaries in southern Saskatchewan, it is proposed to construct a dam on the Wood River near Coderre. This dam will provide a large reserve of water for use during dry periods.

Red Deer River Experimental Gas Well, Atlee, Alta.

The Red Deer River valley near Atlee, Alta. is in the centre of a large grazing area, where the ranching industry is subject to severe hazards due to periodical droughts. Production of reserve supplies of forage by the irrigation of river bottom lands along the Red Deer Valley offers a method of stabilizing the production of livestock in this district. In this area, however, the only feasible method of supplying water to irrigable lands is by pumping. For this purpose a cheap source of power such as natural gas is essential. Incidentally, natural gas is being used for power in irrigation by pumping on the South Saskatchewan river.

With the object of determining if subterranean supplies of natural gas are economically available in the Red Deer Valley it is proposed to sink a test well at a point near Atlee, to a depth of not more than 1000 feet. A careful examination of this area by the Geological Survey of Canada indicates the possibility of gas being found in adequate quantities at a depth of between 500 and 600 feet. Should this estimate be verified ranchers in the vicinity will be able to sink gas wells with some degree of assurance. The successful development of this project should have a measureable effect in the rehabilitation of the Red Deer Valley in Alberta.

Ground Water Survey

During 1935 the Bureau of Economic Geology of the Federal Department of Mines conducted a systematic survey of ground-water resources of the southern portion of Saskatchewan as far north as Township 32. The object of the survey conducted by the Bureau of Economic Geology was to secure reliable information relative to the occurrence of

ground-water supplies which would be useful to farmers, ranchers, and others in locating wells for domestic or stock-watering purposes. This work was complementary to the surface water development programme of the Department of Agriculture.

During the field season the ground-water survey covered an area of 80,000 square miles, comprising 2,200 townships, and records of approximately 60,000 wells were obtained, together with a large number of water samples for analysis. Publication of the results of this work is in progress.

Expenditure under the
Supplementary Public Works Construction Act, 1935
Item 6, Western Conservation Works
For the Fiscal Year Ending March 31, 1936

<u>Project</u>	<u>Expenditure</u>
Val Marie Irrigation Project, Sask.	\$ 3,935.08
Wild Horse Dam, Alta.	8,036.37
Souris Dam, Man.	4,000.00
Crystal City Dam, Man.	2,978.91
Middle Creek Storage Reservoir, Sask.	3,261.31
R.M. Edward Stockwatering Dams, Man.	9,389.84
Lajord Reclamation Project, Sask.	7,500.00
Eastern Irrigation District, Brooks, Alta.	14,990.00
Canada Land and Irrigation Company, Alta.	15,000.00
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Total	\$ 69,091.51
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